Small Business Innovation Research/Small Business Tech Transfer

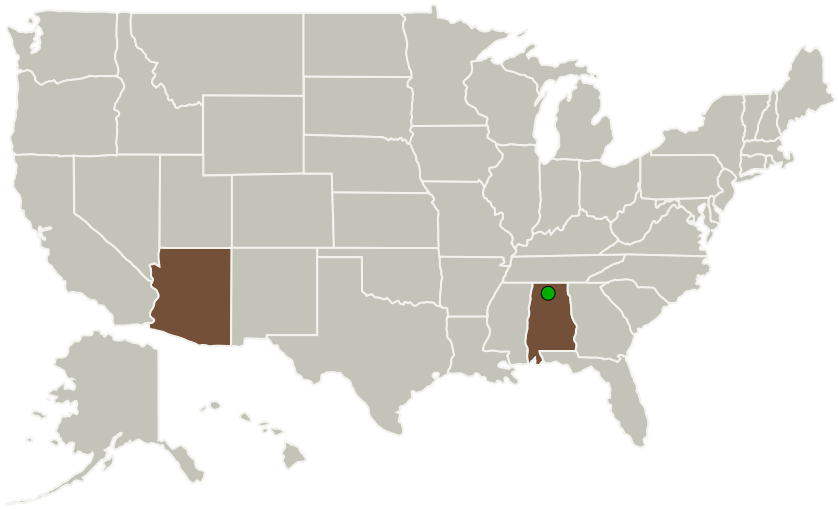
Low Coherence, Spectrally Modulated, Spherical Wavefront Probe for Nanometer Level Free-Form Metrology, Phase I

Completed Technology Project (2015 - 2016)

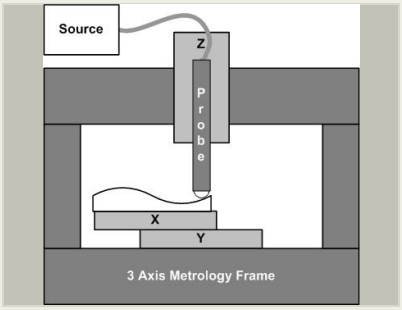
Project Introduction

To-date free-form optic manufacture is limited due to inadequate metrology to measure surfaces with free-form and conformal shapes, with large surface slopes and to the required measurement uncertainty. In this proposal we describe a new interferometric non-contact probe capable of measuring free-form optics with nanometer sensitivity. The probe has favorable metrology characteristics and uses a new interferometric modality allowing the advantages of low-coherence interferometry in common path interferometer designs. The combination of high acceptance angles and high sensitivity make possible the use of a simple three-orthogonal-axis metrology frame and fulfills the precision requirements demanded by NASA and industry. The projected data acquisition rates in excess of 10 kHz will provide an attractive manufacturing metrology tool.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Apre Instruments, LLC	Lead Organization	Industry	Tucson, Arizona
Marshall Space Flight Center(MSFC)	Supporting Organization	NASA Center	Huntsville, Alabama



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Primary U.S. Work Locations	
Alabama	Arizona

Project Transitions

June 2015: Project Start

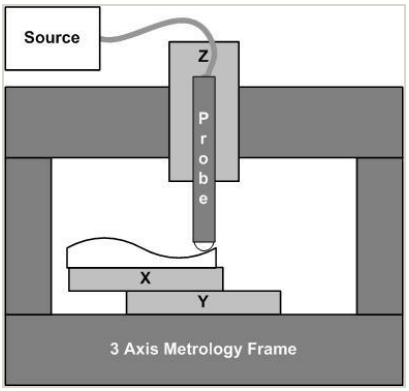
March 2016: Closed out

Closeout Summary: Low coherence, spectrally modulated, spherical wavefront probe for nanometer level free-form metrology, Phase I Project Image

Closeout Documentation:

- Final Summary Chart Image*(https://techport.nasa.gov/file/139170)*

Images



Briefing Chart Image
Low coherence, spectrally modulated, spherical wavefront probe for nanometer level free-form metrology, Phase I *(https://techport.nasa.gov/image/126713)*

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Apre Instruments, LLC

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

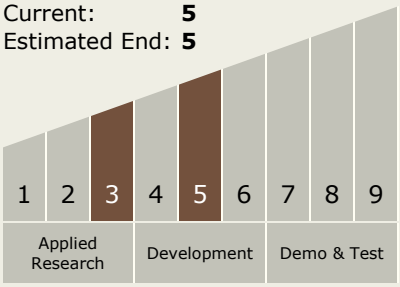
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Artur Olszak

Technology Maturity (TRL)

Start: **3**
Current: **5**
Estimated End: **5**



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Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.2 Observatories
    - TX08.2.1 Mirror Systems

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System